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CROP WATCH

University of Nebraska Cooperative Extension
Institute of Agriculture and Natural Resources

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Some herbicides offer 'reach-back' control

Dry weather since corn planting has been common across much of Nebraska. Many areas received less than 0.25 inch of rain since planting, which will likely reduce the performance of preemergence herbicides. This is not a problem with herbicides incorporated into the soil by tillage although their performance is greatest with adequate soil moisture. Herbicides applied to the soil surface need to be moved into the top one to two inches of soil to control germinating weed seedlings. On fine textured soils, 0.75 to 1.0 inch of rainfall is required to accomplish this. Rainfall less than 0.5 inch likely will result in reduced performance. Any weeds that emerge before one-half inch of rainfall or sprinkler irrigation will likely become problems. Where these dry conditions have occurred, growers should monitor fields closely and be prepared for additional weed control measures.

Rainfall of one inch or more following weed emergence may help provide "reach-back" control of emerged weeds. "Reach-back" occurs with some herbicides when moisture pushes the herbicide down to the roots of emerged weed seedlings. Seedlings taller than two inches will require alternative control methods. Shoot-absorbed herbicides will have little reach-back while root-absorbed herbicides will have the most potential for reach-back. The potential for reach-back depends on soil texture, precipitation, herbicide and size of emerged weeds. The table lists soil-active herbicides and their reach-back potential.

Jeff Rawlinson
Extension Assistant, Weed Science
Alex Martin
Extension Weed Specialist

Herbicide "reach back" activity

	Grasses	*Broadleaf*
Atrazine	Some	Yes
Axiom	No	Some
Bicep	Some	Yes
Bladex	Yes	Yes
Broadstrike + Dual	No	Yes
Bullet	Some	Yes
Canopy	No	Yes
Command	Yes	Yes
Commence	No	Yes
Contour	No	Yes
Detail	No	Yes
Double Play	Yes	No
Dual	No	No
Eradicane	Yes	No
Extrazine	Yes	Yes
Frontier	No	No
Guardsmen	Some	Yes
Harness	No	No
Harness Xtra	Some	Yes
Hornet	No	Yes
Lariat	Some	Yes
Lasso	No	No
Lexone	No	Yes
Lorox	No	Yes
Partner	No	No
Prowl	No	No
Pursuit	No	Yes
Pursuit Plus	No	Yes
Python	No	Yes
Ramrod	No	No
Ramrod + Atrazine	Some	Yes
Sceptor	No	Yes
Sencor	No	Yes
Sonalan	No	No
Squadron	No	Yes
Steel	No	Yes
Surpass	No	No
Surpass 100	Some	Yes
Sutan	No	No
Topnotch	No	No
Treflan	No	No
Turbo	No	Yes

Bean leaf beetles feeding on corn

There have been several reports of bean leaf beetles feeding on corn. They may do a little feeding on corn now, but it is not a preferred host and as soon as soybeans begin to emerge they will move to soybeans. Bean leaf beetles also may be in alfalfa now. Early emerging soybeans are most likely to be damaged by bean leaf beetles. Next week's *Crop Watch* will feature a story by Keith Jarvi on scouting and management of the bean leaf beetle in soybeans. Information also is available on the UNL Department of Entomology's web site at: http://www.ianr.unl.edu/pubs/insects/g974.htm

Bob Wright, Extension Entomologist, South Central REC, Clay Center

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Field updates

Flea beetles

Bob Wright, Extension entomologist at the South Central Research and Extension Center near Clay Center: I received a report of flea beetles damaging emerging corn near Wilcox. This extends our previous reports from southeastern Nebraska. These small (about 1/16 inch long) shiny black beetles may be difficult to see. They are excellent jumpers because of their enlarged hind legs, hence the common name 'flea beetles'.

On corn 4-6 inches tall, treatment is probably justified if there are 5 or more beetles per plant; on younger corn fewer beetles are capable of causing economic damage. A variety of foliar insecticides (Sevin, Lorsban 4E, Asana XL, Warrior, Lannate, Ambush, or Pounce) would be expected to provide adequate control.

Ray Weed, Extension Educator in Kimball and Banner counties: Wheat in Banner County was severely damaged by hail Sunday night. Some will survive and some was mowed down at about a 1-inch height. Most was in the jointing stage. Winter wheat here is quite variable within fields. We are having some acreage reductions due to crown and root rot, Septoria, and cutworms (especially pale westerns now). We also are still seeing the effect of freeze damage on winter wheat leaf tips with some tissue damage. Alfalfa that was treated in recent weeks for army cut worms is recovering nicely.

Farmers here have planted a large percentage of their corn crop acres. While there had been some recent precipitation in some areas, total precipitation lagged behind the average for this period.

Ralph Anderson, Extension educator in Buffalo County reports: planting has progressed well here this past week. The majority of both corn and soybeans are planted, especially in the Platte Valley. We have had some moisture this week (.35-.5 inch) that should have activated the chemicals. Some pivots have been running to water corn and activate herbicides. No major insect or disease problems.

Gary Tordrup, Extension assistant in Clay and Webster counties: The conditions in south central Nebraska are favorable for planting. In most areas the top 2-4 inches of soil is dry. Some center pivots are running to get the corn and beans up where the top soil was dried out by cultivation. Sub soil moisture is very adequate. Flea beetles are being found at economic thresholds in many corn fields — both irrigated and dryland. I have found 6-10 beetles per plant in many fields, with some wilting of plants. Some have been treated for flea beetles and there should be constant scouting as new plants emerge.

Dick Ronnenkamp, Extension educator in Boone and Nance counties: Corn planting is largely completed here. The corn started to emerge over the weekend. Many producers have started irrigation systems to encourage stand establishment and activate herbicides. Monday rains missed most of the area and moisture is a growing concern. Soybean planting is underway. With no rain, there is no reason to stop field work.

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Pest pressures less than usual

Wheat survey: above average yield potential, but rain needed urgently

The Nebraska wheat crop has the potential to yield at least 43 bushels to the acre, according to field observations made statewide during the fifth annual Wheat Quality Survey last week. This is about three bushels per acre more than estimated during the 1997 survey; however, due to dry soil in the top 6-12 inches of most fields, particularly in west, southwest and west central Nebraska, the crop could lose 10 to 15 bushels or more per acre if there isn't sufficient rainfall soon.

Topsoil moisture is the most critical factor now. Without it the plant roots, now located in the upper 6-10 inches of soil, will not be able to grow deeper to reach the moisture stored in the subsoil. This moisture will be needed to supply the wheat plant demands during the heading, flowering, and grainfill stages when an average stand of wheat will use about 0.3 inches of water per day.

"The crop looks good now across the state," said Nebraska Wheat Growers Association President Bob Nodlinski of Brule, "but it is very dry in the Panhandle. We couldn't get the moisture probe in the ground in most fields." Reports from eastern Nebraska survey participants indicated there was adequate topsoil moisture in the wheat production areas south of the Platte River until they reached the area of Furnas and Gosper counties. From there west to the state line, topsoil moisture continued to decrease.

Most fields observed had uniform plant populations with well developed root systems. There were isolated incidents of soilborne mosaic virus, tan spot, speckled leaf blotch, wheat streak mosaic virus, army cutworm, and winter injury, but most of the fields along all routes had below average disease, insect, and weed problems. In the eastern third of the state, although moisture was readily available, observers did note some degree of nitrogen deficiency in many fields, especially those following soybeans. They also noted soil compaction, uneven stands and a general lack of good crop management practices.

During the two-day survey tour, the 23 participants split up into several teams to thoroughly survey much of the Nebraska wheat production area. Each survey team used a mathematical model provided by the Nebraska Agricultural Statistics Service to predict the yield of the random fields surveyed based on the number of tillers present and other important factors impacting yield. Yield estimates ranged from the low 20s to more than 70 bushels per acre for the surveyed fields.

Most of the fields were in the jointing or stem elongation stage. Plant heights ranged from 8 to 20 inches, with the growing point from just above ground to 8 inches above. Crop development on the average appears normal and is five to seven days ahead of last year. This could decrease the probability that temperatures of 90 degrees or above will stress the wheat during grainfill, cutting yield and test weight.

The second day of the Nebraska field survey concluded by meeting in Colby, KS, and reporting results to the participants in the Kansas Winter Wheat Quality Tour sponsored by the Wheat Quality Council.

The 1998 Wheat Quality Tour was sponsored by the Nebraska Wheat Growers Association and the Nebraska Wheat Board. Observers included wheat producers and staff of these organizations, plus representatives from the Nebraska Agricultural Statistics Service, Nebraska Department of Agriculture. U.S. Risk Management Agency, Nebraska Crop Improvement Association, seed industry and grain trade.

Dan Benes, Information Specialist, Nebraska Wheat Growers Assn.
Roger Hammons, Manager, Nebraska Crop Improvement Assn.
Steve Knox, Field Services Supervisor, Nebraska Crop Improvement Assn.

Wheat Field Day changes

Please change your Wheat Field Days schedule (*Crop Watch* 98-8, pg. 80) to reflect the following changes:

The Winter Wheat Plot Field Day scheduled for June 15 in Custer County will begin at 5:30 p.m.

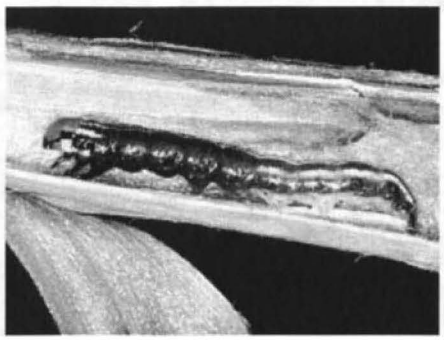
The Winter Wheat Plot Field Day scheduled for June 26 at the regional wheat nursery in Banner County will begin at 5:30 p.m.

Common stalk borers likely to appear soon

Stalk borer moths lay their eggs in the fall on grassy plants. Often these are in fence rows, grass waterways or terraces bordering crop fields. These eggs hatch in late April or early May and larvae bore into the grasses or other weeds such as ragweed, and begin feeding. As they get larger or if the plants are mowed or burned down with herbicides, the stalk borers move into adjacent corn plants to complete their development.

Common stalk borers are rather distinctive in appearance, with three white stripes on a brownish-purple background. The two stripes on the side stop just behind the three pairs of true legs, then continue about half-way down the length of the caterpillar. Stalk borers may kill the growing point if they bore into the base of the stalk. If feeding starts in the whorl and moves down into the stalk, ragged feeding holes may result.

Current data indicates we accumulated 500-700 degree-days (base 41 F) from Jan. 1 to May 10. Based on research at Iowa State University, stalk borer egg hatch begins at about 575 degree days and should be complete at 750 degree days. Begin scouting corn when 1,300-1,400 degree days have accumulated. Updated degree day maps will be published in future *Crop Watch* issues.



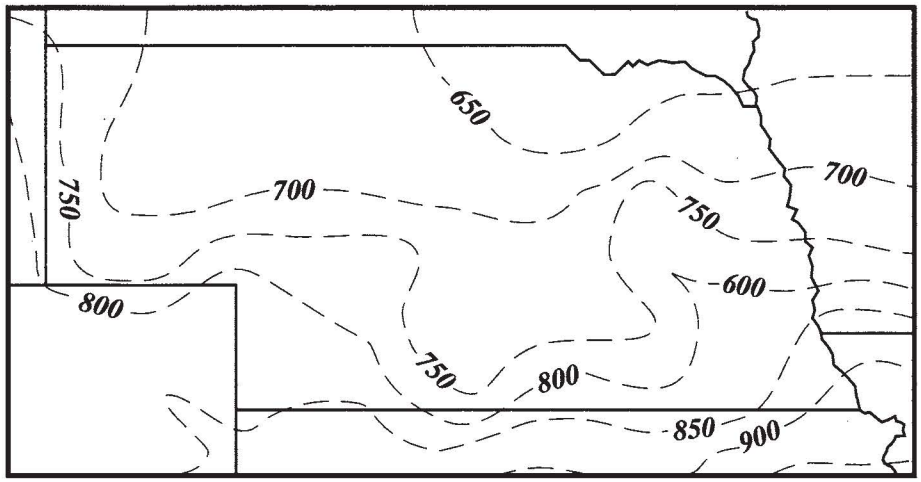
Common stalk borer

Check corn plants bordering grassy areas to determine the percentage of plants with live stalk borers. Use the table below to determine the economic threshold. In cases where stalk borers begin feeding on grassy weeds, or other vegetation in field edges, control is most effective if timed between 1400-1700 degree-days (base 41 F), which corresponds to first half of the period that stalk borers are migrating from weedy hosts into corn. If the infestation is restricted to the field margin, use a border treatment. Ambush 2E (6.4-12.8 oz per acre), Asana XL (5.8-9.6 oz per acre), Lorsban 4E (2-3 pints per acre), Pounce 3.2EC (4-8 oz per acre) or Warrior 1EC (2.56-3.84 oz per acre) are labeled for use against stalk borer on corn.

Bob Wright
South Central Research and Extension Center, Clay Center

Stalk borer economic thresholds (from Iowa State University). Assumes $13 per acre control costs and 80% control by an insecticide.

Corn leaf stage	*Percent infested plants at two corn prices*	
	$2/bu	*$3/bu*
1	10	7
2	12	8
3	15	10
4	16	11
5	17	12
6	34	23
7	100	100

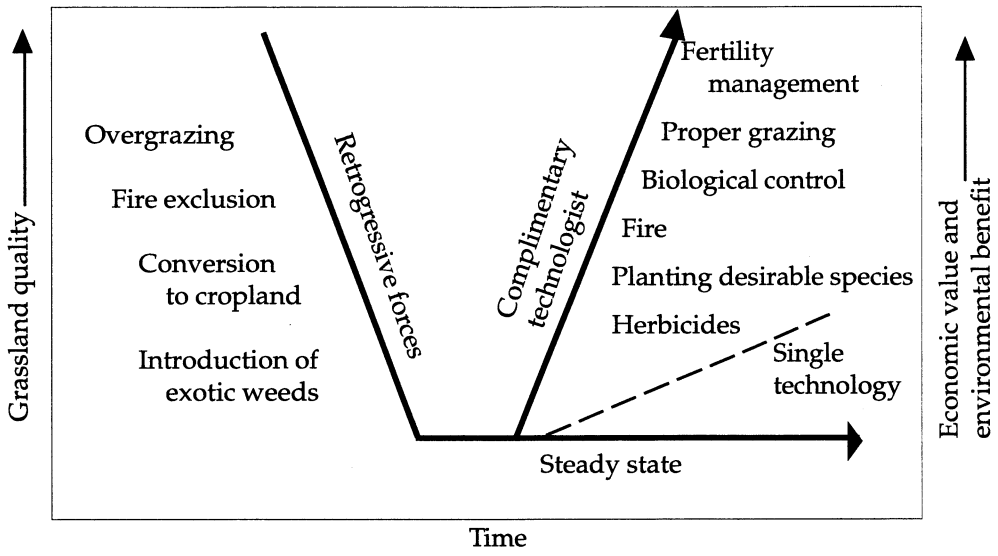


Common stalk borer scouting

Growing degree day (GDD) accumulations since Jan. 1 on a 41 F base for the common stalk borer. Begin scouting at 1,300-1,400 accumulated GDDs. *(Map prepared by Al Dutcher, State Climatologist, UNL Agricultural Meteorology.)*

Weeds signal pasture health; listen to their messages

Increasingly weeds are being viewed as evil, worthless creatures that should be eliminated. They have little or no economic value, so they must be worthless. In fact, they cost us money if they aren't dealt with. Yet in some areas, including range and pastures, weeds can be a valuable tool. They are our first and most important critics, telling us something about our management.



Grassland value increases with integrated weed management. (From: *Developing Integrated Weed Management Strategies to Improve Leafy Spurge-infested Grasslands*, 1998. B. Masters, Center for Grassland Studies, University of Nebraska, Lincoln.

Early season

By definition, a weed is any plant growing where it is not desired. Early season plants are usually the first weeds to emerge or germinate in pastures. Cool-season grasses including Kentucky bluegrass, annual bromes and quackgrass begin emerging in late March-early April. Because these plants emerge early, they have the first shot at soil moisture. In pastures, this is a serious problem. Early season weeds compete with desirable forage species and reduce yield, resulting in reduced weight gain by livestock. Not all cool-season grasses are weeds — many early season plants including smooth brome, needle and thread, and wheatgrass are very desirable species that allow for early and late season grazing. Desirable cool-season forage can allow for a more flexible grazing system in some areas. Remember that some plants that aren't grasses also are not weeds. Several species including lead plant, clover, and prairie coneflower are desirable for pastures and indicate, when present in small amounts, that the system is healthy.

Cool-season weed invasions in warm-season pastures are typical. Naturally, these invasions were halted by wild fires in late summer and the grazing of wild herbivores. These same practices can and are successfully used today to retard cool-season weeds. Fire, used appropriately in mid to late spring, suppresses growth and development of cool-season plants, giving the warm-season plants a competitive edge. Grazing by livestock is also a viable management option used to retard cool-season weeds. When these weeds are a problem, heavier grazing in the fall or turning livestock out earlier in the spring can help suppress these weeds. This late and/or early season pressure will stress cool-season weeds at a time when their carbohydrate reserves are low, resulting in lower vigor and reducing their ability to compete with the coming warm-season plants. Fertilizer also can be used to control cool-season plant invasions. Fertilizing in late May to early June will give warm-season forage an advantage over cool-season weeds. Remember, these actions also will stress desirable cool-season forages. Regardless of management options, relying on integrated weed management rather than one single technology will accelerate development of high quality grasslands (*above figure*).

Early seral species

In order to effectively control weeds in pastures, it's good to understand the biology of plants in grasslands. Succession, the process of community change where one plant species replaces another until climax vegetation is reached, occurs constantly in grasslands. Any disturbance to this system, such as heavy grazing or concentration of livestock around areas such as water tanks, will open areas of the pasture to invasion by early seral species or

(Continued on page 86)

Reading weed signals *(Continued from page 85)*

plants which invade during the early stages of succession, including buffalobur, kochia, marestail and ragweed. These species are the first to move into a disturbed area where the canopy has been opened. Their presence may be telling you that grazing pressure or disturbance may be too high in some areas, suggesting that you decrease grazing pressure or simply change the livestock distribution within a pasture. Reducing the amount of disturbance to a site will close or heal disturbed areas, making them less desirable to early seral species. Seed from these weeds is probably present throughout the pasture. The fact that they germinate or appear only in highly disturbed areas and not in healthy sites is proof that good management is working.

Increasers/decreasers

Some plants seem to proliferate as grazing pressure increases. Increasers such as ironweed, goldenrods, pussytoes, pricklypears, scurfpea and yarrows, are plants that proliferate as grazing pressure increases because competition is reduced. These are plants that livestock will not readily seek but may eat if desirable forage has been depleted. Under good management, these weeds are not allowed to become prevalent in pastures. Once grazing pressure has become too intense, their presence should tell you something. (Figure 2). Desirable forage species such as switchgrass and big bluestem are called decreasers because they decrease in abundance with grazing pressure. These plants are very palatable and do not withstand heavy grazing pressure very well. A significant reduction in these species should be a warning to reduce grazing pressure during critical plant growth stages.

Poisonous plant

Plants that are harmful to livestock due to chemical compounds they produce are a special problem because they do not have to be present in large numbers to cause considerable economic damage. Poisonous plants including dwarf milkweed, riddell groundsel, and death camas contain either alkaloids or selenium which can rapidly decrease livestock condition, resulting in death at large doses. Locoweed, an early emerging perennial, contains locoine, a toxic substance affecting the optic nerve of livestock, resulting in loss of weight, depression, rough coat and possibly death at extremely large doses. Other plants including ragweed and tall gaura can accumulate nitrates which can poison livestock. This is especially true for ragweed during drought conditions or when sprayed with 2,4-D which should not be used to control ragweed around stock tanks. Usually, livestock will not consume these plants as they are not palatable. Do not turn livestock out in pastures with infestations of poisonous plants until desirable forage is readily available. Heavy infestations may be telling you that the stocking rate is too high.

Exotic invaders

Exotic invaders including musk thistle, Canada thistle, leafy spurge, knapweed, and purple loosestrife are most difficult to control. These plants were introduced and lack the natural control element that kept them in check in their native habitat. They can be the most destructive economically due to infestation and dollars required to control them. They also represent a class of weeds that may become prevalent even with good management. Whether introduced by wind, wildlife, livestock or man, these exotic weeds are vigorous competitors that can quickly crowd out desired forage rendering pastures useless. This class of weeds may be telling you that stocking rate is too high or grazing pressure is too intense. The best method of controlling exotic invaders is to prevent their occurrence. Be careful not to bring infested hay into clean pastures. Do not bring livestock from infested pastures into clean pastures. The same holds true when moving equipment. Simple precautions may save time and money in the future. Some plants may be suppressed with several years of mowing or shredding. Others such as leafy spurge will require chemical control (see the *1998 Guide for Herbicide Use in Nebraska*). Because livestock do not seek these plants, grazing as a management tool is usually ineffective. However, overgrazing can contribute to their occurrence.

Jeff Rawlinson
Extension Assistant Weed Science
Alex Martin
Extension Weed Specialist

Voracious squirrels in your corn?

Gary Hall, Extension educator in Phelps and Gosper counties asks: We have ground squirrels feeding on newly planted corn. What's the best method for discouraging them?

Keith Glewen, Extension Educator in Saunders County: There is a NebGuide on thirteen line ground squirrels. We too have problems with these beasts in the fields at the Crop Plant Diagnostic

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Assess alfalfa first cutting, then plan to counter problems

The first cutting of alfalfa offers an excellent opportunity for assessing your stand and pest problems and planning a response, where necessary.

Take a few moments to loow for weeds, weevils and thin spots in your stand. Count the number of stems per square foot.

If you find problems, immediately start to plan how to deal with them. For instance, if you have too much pennycress or mustard or downy brome in your first cutting, consider spraying dormant herbicides next fall to kill these weeds.

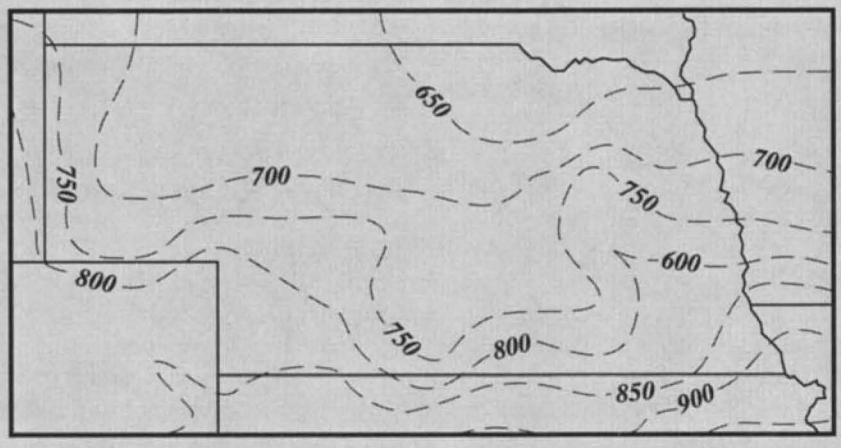
Are stands getting thin? Can you determine why? And does this allow weeds to invade? Maybe it's time to rotate to another crop. If you have other good options, most dryland fields should be rotated after four to five years and irrigated fields every five to six years.

If some areas of the field don't produce well but the stand is still thick, check for problems like dry subsoil, compaction, or inadequate fertility. When you have an answer, then you can work toward achieving some solutions.

How do your alfalfa plants look when you cut them? Are lower stems dark colored with many leaves on the ground? Spring blackstem may be a problem. Do most plants have open blossoms? Or are new shoots starting to grow and getting cut off by your mower? In all these examples, earlier harvest might be wise next year.

Take some time to look more closely at first cut alfalfa. It may make you a better manager next time.

Bruce Anderson
Extension Forage Specialist



Alfalfa weevil scouting

This map indicates Base 48 growing degree days (GDD) accumulated since Jan. 1. Alfalfa producers throughout Nebraska should be scouting for this pest. Feeding is noticeable after 375 GDD have accumulated. *(Map prepared by Al Dutcher, State Climatologist, UNL Agricultural Meteorology.)*

Plant and Pest Diagnostic Clinic Update

Alfalfa diseases are starting to appear. Common leaf spot and crown rot were diagnosed in the clinic this week. Common leaf spot symptoms are small, circular, dark brown or black spots on the leaflets. Common leaf spot often occurs together with spring black stem. Spring black stem symptoms appear on stems and leaves mostly and are small black spots which are irregular in shape. Spring black spot lesions will enlarge and merge until much of the leaflet is covered.

Spring foliar diseases of alfalfa can be kept in check by using several management practices. Resistant varieties for common leaf spot are available. Adjust cutting schedule and harvest diseased stands early, if possible, to maintain forage quality. See extension circular *Alfalfa Disease Management* (EC98-1875-B) for more information.

Loren J. Giesler
Plant and Pest Diagnostic Clinic Coordinator

Squirrel feeding

(Continued from page 86)

Clinic at the Agricultural Research and Development Center near Mead. We bought an attachment for our max-emerge planter that places a toxic pellet down with the seed. This seems to provide quick control to those feasting on this menu.

Bruce Anderson, Extension Forage Specialist: Hey folks — make it simple. Feed the varmints. A bushel or two of grain on the ground probably will satisfy their needs so they leave the seedlings alone. It worked all the time when I lived at home in Minnesota, the gopher state.

Nitrogen fertilizer sources: What are the differences and benefits?

(While we realize many subscribers have already applied their nitrogen for this season, others may be sidedressing it. In this story the author addresses a variety of questions typically expressed to Extension staff throughout the year and provides background for a better understanding of nitrogen use.)

Where do the various forms of nitrogen fertilizers come from?

Anhydrous ammonia is a popular form of nitrogen for crop production because it is highly concentrated (82% nitrogen by weight) and is the least expensive form of fertilizer, based on a pound of nitrogen. The air we breathe is about 78% nitrogen gas in the form of the N_2 molecule. Anhydrous ammonia (NH_3) is made by taking nitrogen gas from the air and reacting it in the presence of a catalyst, with steam (H_2O) and methane (CH_4) (natural gas). In addition to the anhydrous ammonia (NH_3), carbon dioxide (CO_2) is produced as a byproduct of this process.

All other forms of commercial nitrogen fertilizer are made from anhydrous ammonia. They each have properties that make them easier and safer to handle than anhydrous ammonia, but they are less concentrated, requiring more product to supply the same amount of nitrogen. Also, they cost more per pound of nitrogen because their manufacture requires more processing and more pounds of material must be transported.

Anhydrous ammonia (NH_3) can be recombined with the carbon dioxide that is a byproduct of the process used to manufacture it in the first place, forming urea ($CO(NH_2)_2$. Urea comes in a dry (pelleted) form that contains 46% nitrogen by weight (46-0-0).

Another common form of dry nitrogen fertilizer is ammonium nitrate. Ammonium nitrate is made by chemically combining anhydrous ammonia (NH_3) with nitric acid (HNO_3), forming the ammonium nitrate compound (NH_4NO_3). Ammonium nitrate is 34% nitrogen by weight (34-0-0).

The most common form of liquid nitrogen fertilizer is urea-ammonium nitrate (UAN). In this process, urea and ammonium nitrate are dissolved in water. The most common concentration contains 3 lbs. of nitrogen per gallon of product and is 28% nitrogen by weight (28-0-0). It also may be sold in a more concentrated form which is 32% nitrogen by weight.

Fertilizers which contain urea and urea/ammonium-nitrate (UAN) solution are the most widely used nitrogen fertilizers in Nebraska after anhydrous ammonia. Dry urea is popular as a nitrogen fertilizer compared to other fertilizers because of its relatively high nitrogen content, good storage and handling properties, and widespread availability. UAN solutions are popular because of the versatility of a liquid source, as well as widespread availability.

One of the selling points for urea-based fertilizers over anhydrous ammonia is that they can be broadcast to the soil surface, while ammonia must be injected into the soil. Broadcast application is faster and less expensive than injection. However, broadcasting urea-based fertilizers carries the risk of nitrogen loss to the atmosphere through volatilization. The potential loss due to volatilization is influenced by several soil and climatic factors, but often the most important factor is the amount of precipitation soon after fertilization.

Are some forms of nitrogen fertilizer more effective than others?

While the air we breathe is about 78% nitrogen gas N^2, plants cannot use nitrogen gas as a nutrient. Of the major nitrogen compounds found in commercial fertilizers, plants can use both the ammonium form, NH_4^+ and the nitrate form NO_3^- of nitrogen, but they cannot use the urea form $(CO(NH_2)_2$ directly. The ammonium form is held on the soil particles and becomes part of the cation exchange process. Nitrate is dissolved in the soil water and is taken up by plant roots along with the water. Urea, on the other hand, must be changed into one of the other forms of nitrogen by physical and microbial action before plants can use it as a nitrogen source. When urea is applied to soil, it combines with water to form ammonium carbonate $(NH_4)_2CO_3$. Ammonium carbonate then decomposes to form ammonia gas (NH_3) and carbon dioxide (CO_2).

If the ammonia gas produced by decomposing ammonium carbonate contacts moist soil, it immediately reacts with water to form ammonium $(NH_4)^+$ and hydroxide $(OH)^-$ ions. This is exactly the same reaction that occurs when anhydrous ammonia is injected into the soil. In both cases, the ammonium ion is then attracted to and held by negatively charged clay and organic matter particles in the soil and is available for use by plants. All nitrogen sources are equally available and equally effective, provided volatilization and leaching losses are negligible.

Tom Dorn, Extension Educator, Lancaster County